

REPORT DOCUMENTATION PAGE

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| | | <p>A</p> | | Leilani Richardson |
| a. REPORT | b. ABSTRACT | | | c. THIS PAGE |
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FILE



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MEMORANDUM FOR PRS (In-House Publication)

FROM: PROI (STINFO)

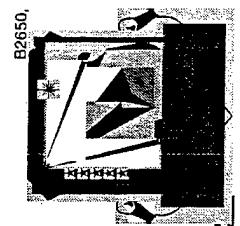
22 March 2002

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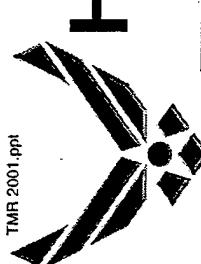
SUBJECT: Authorization for Release of Technical Information, Control Number: AFRL-PR-ED-VG-2002-067
55449 T.W. Hawkins (PRSP), "HEDM Monopropellant Development"

Chief Scientist Tour
(Edwards AFB, CA, 07 March 2002) (Deadline: Past Due)

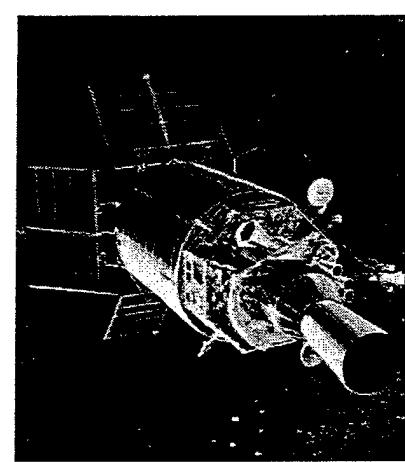
(Statement A)



HEDM- Advanced Monopropellants

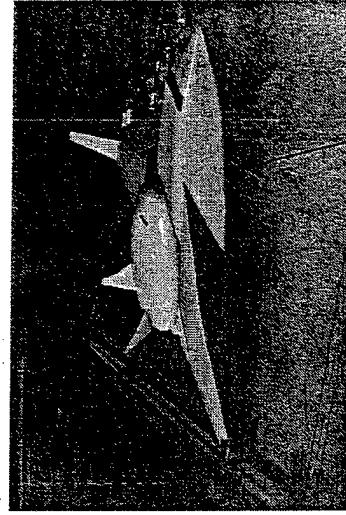


Monopropellant Development
for Next-Generation
IHPRPT Thruster

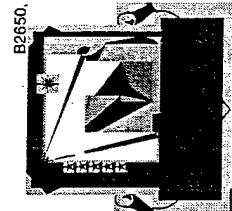
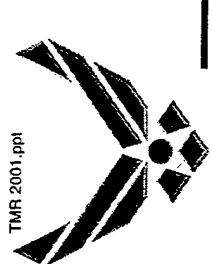


Monopropellant Feasibility for
Emergency Power Units
(F-16/U-2 SPOs)

HEDM 6.2 Projects



Advanced Monopropellant for
Large Engines
(NASA MSFC)



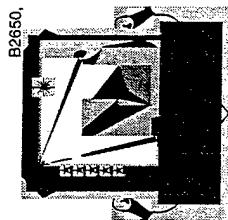
AF-M315 in Next Generation Spacecraft Thruster

- Advanced thruster for monopropellant (AF-M315)

First USAF monopropellant accepted into CPIA Liquid Propulsion Manual

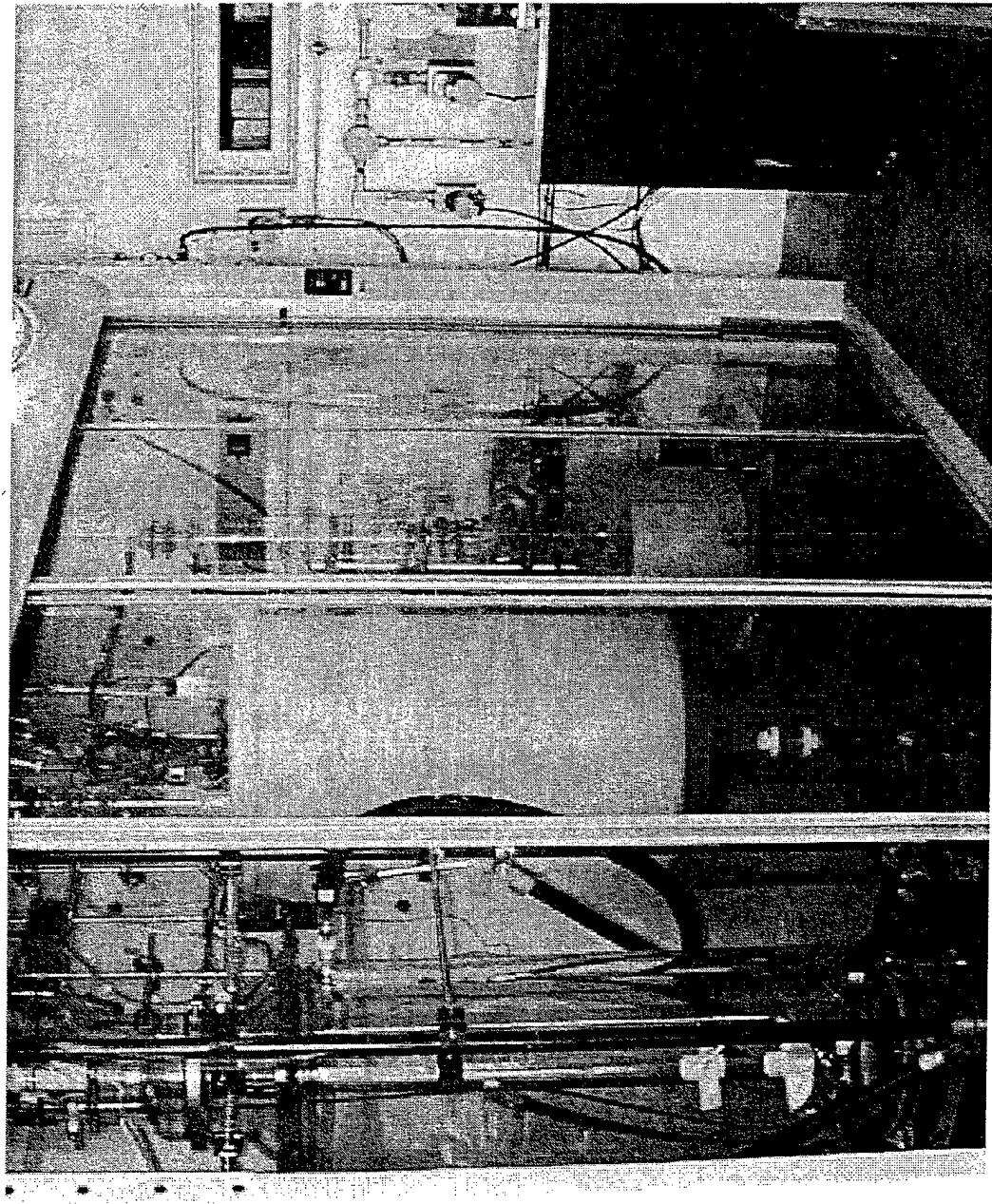
High Performance Capability!

- Propellant downselected for Advanced Thruster Program

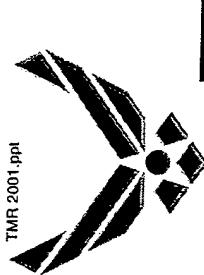


B2650.

**Grand Opening of
the Area 1-30 Pilot Facility at Test Cell 27
March 4, 2002**

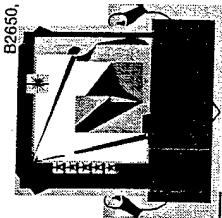


TMR 2001.ppt

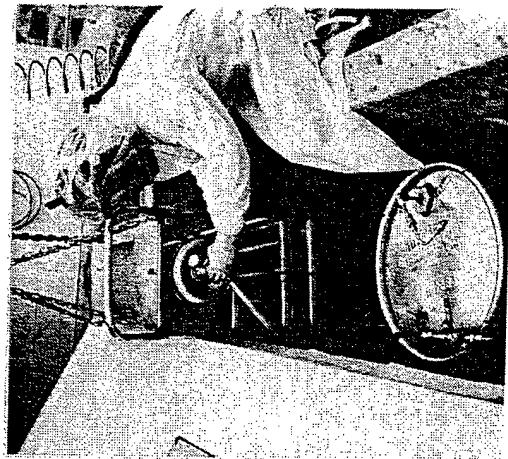
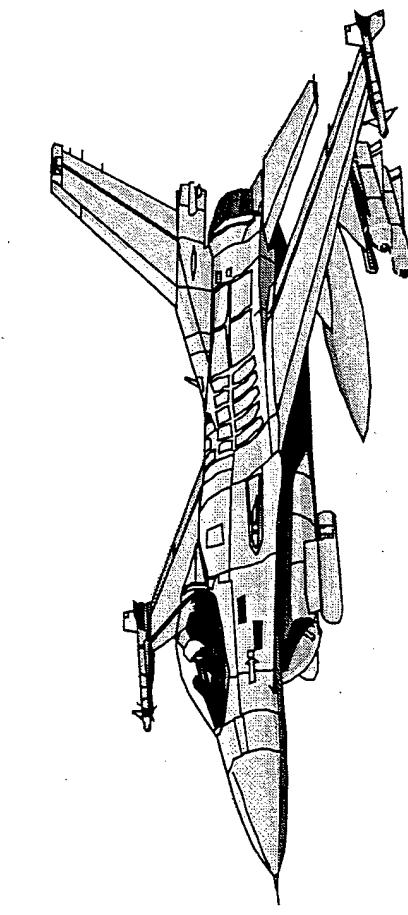


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EPU Feasibility Assessment



Can IHPRPT Monopropellant Approaches be Modified for EPUs?

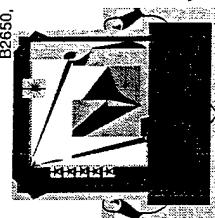


Chronology

- F-16 and U-2 SPOs direction for program proposal (2000)
- F-16 (ASC/TPV) and U-2 (YPV/RAE) SPOs proposal approval for limited feasibility program (2QFY2001)

Payoff

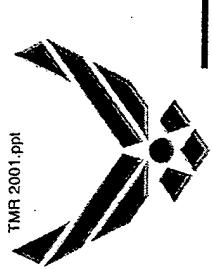
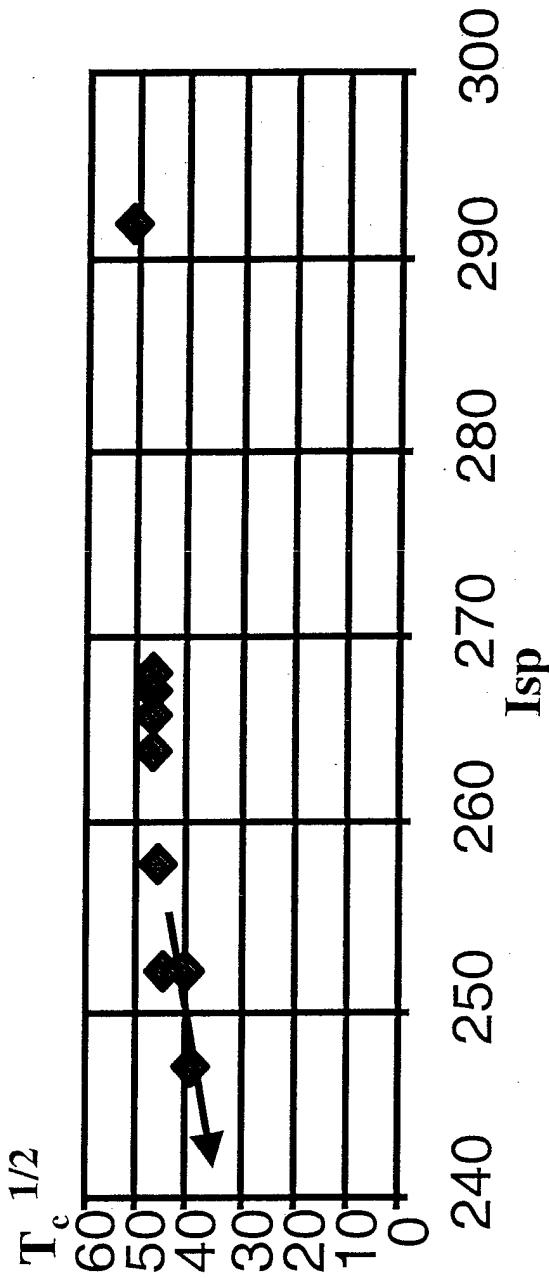
- Eliminate heavily regulated fuel
- Cut base/depot surveillance costs for F-16 and U-2

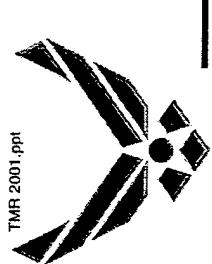


EPU Feasibility Assessment -Project Objectives-

Reformulate Propellants

- Determine composition options
(ODE-type computation)
- Lower performance/combustion
temperature (compatible with Shell
405 catalyst)



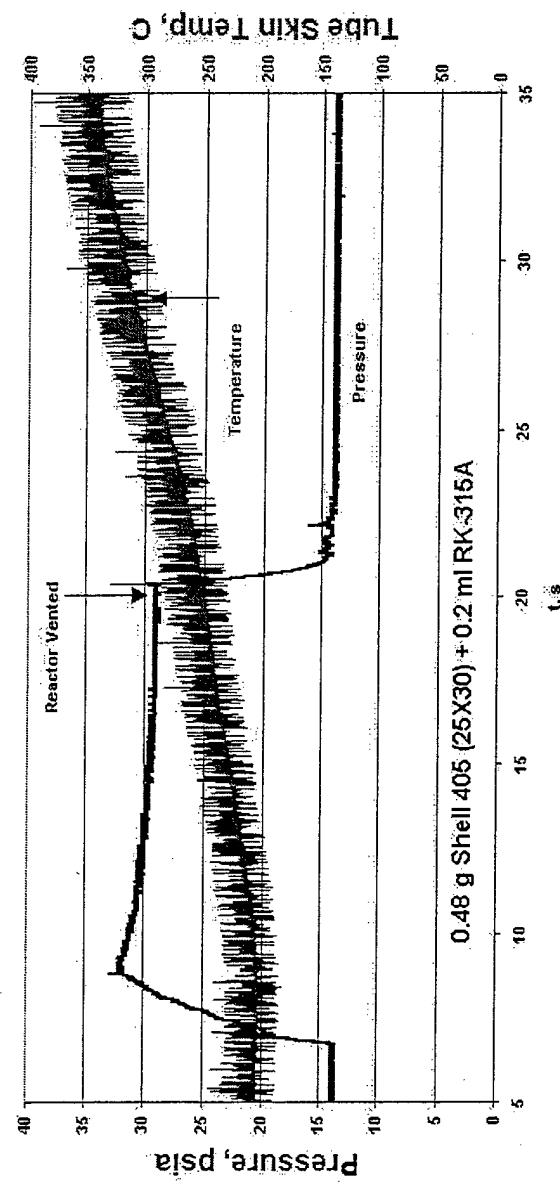
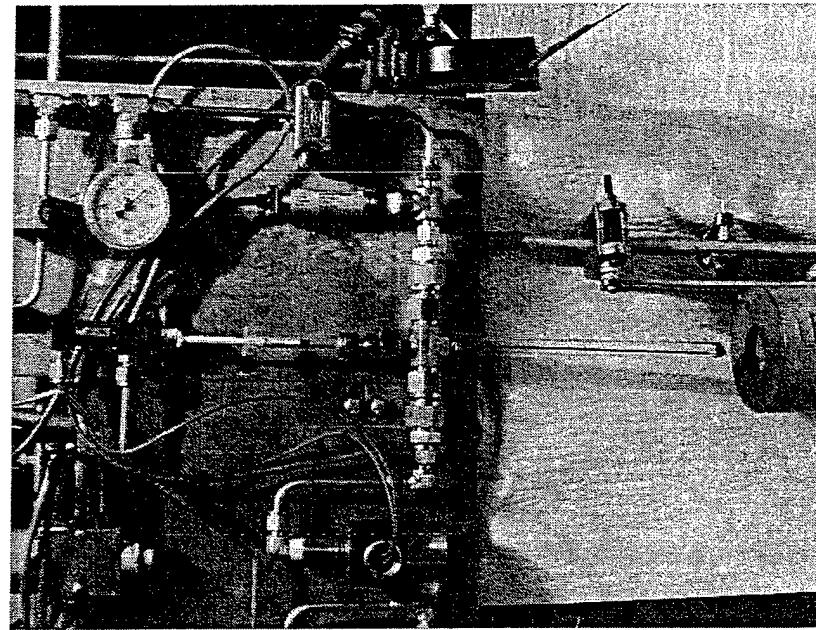


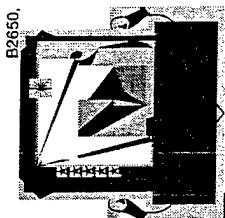
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Propellant Ignition Assessment

AFRL Pino Test

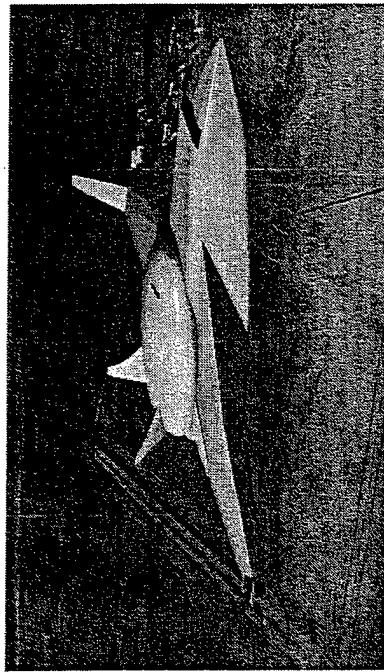
- Adjustable bed temperature
- Variable pressure capability





Advanced Monopropellant for Large Launch Vehicles

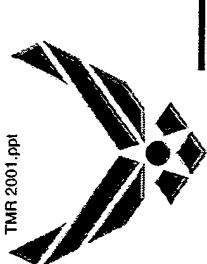
Can IHPRPT monopropellant be modified for large launch engines?



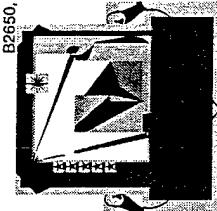
Chronology

- NASA-MSFC requests proposal for feasibility project (4QFY2000)
 - Single propellant for entire vehicle
 - Eliminate cryogenic fuels
- AFRL/PRSP submits proposal (1QFY2001)
 - Eliminate one pumping system
- NASA-MSFC approves/funds (3QFY2001)

Payoff



Project Objectives



B2650.

I. Determine necessary monopropellant characteristics

- Identify required performance, safety, hazard, physicochemical properties

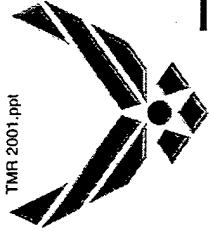
II. Determine monopropellant options

- Focus on new monopropellant class

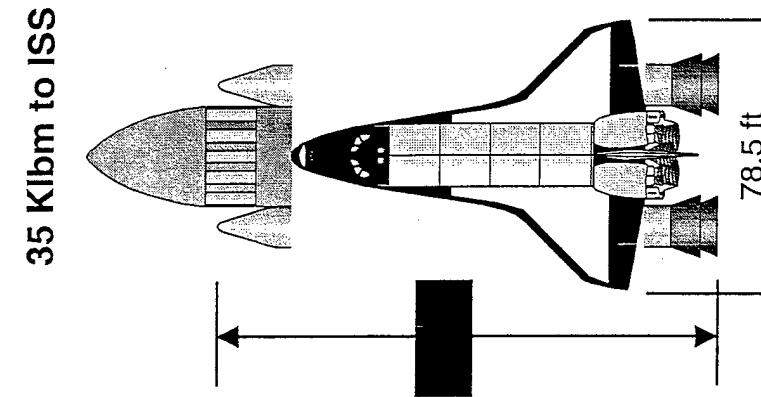
III. Produce/Characterize a propellant candidate (ca. 50 gram-scale)

- safety/hazards properties/ignition
- physicochemical properties (density, rheology, freezing point...)

Vehicle System Comparison / Summary



STS (Space Shuttle)



Pressure Feed
35 Klbm to ISS
Glow = 14.7 Mlb

Pump Feed
36 Klbm to ISS
Glow = 5.6 Mlb



Pump Feed
High Performance Prop
35.5 Klbm to ISS
Glow = 2 Mlb